



Missouri Department of Natural Resources

## Total Maximum Daily Load Information Sheet

### McKenzie Creek (pH)

---

#### Waterbody Segment at a Glance:

**County:** Wayne  
**Nearby Cities:** Piedmont  
**Length of impairment:** 0.5 miles  
**Pollutant:** pH  
**Pollutant Source:** Natural



State map showing location of watershed

**TMDL Priority Ranking:** TMDL approved 2004

---

#### Description of the Problem

##### Beneficial uses of McKenzie Creek

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Protection of Human Health associated with Fish Consumption

##### Use that is impaired

- Protection of Warm Water Aquatic Life

##### Standards that apply

- Missouri's Water Quality Standards (WQS), 10 CSR20-7.031 Section (4)(E), state that water contaminants shall not cause pH to be outside of the range of 6.5-9.0 Standard Units (SU)

McKenzie Creek is a tributary to the Black River. In the upper portion of the watershed, a one-half mile segment of McKenzie Creek is impaired by low pH, due predominantly to the low pH (acidic) of rainwater in the area (4.7 SU<sup>1</sup>). The predominant rocks in this watershed are igneous, do not buffer rainwater the way carbonaceous rocks throughout most of Missouri do. This low pH problem may be aggravated by discharge from a granite quarry that enters McKenzie Creek through a tributary. Water quality monitoring of the creek by the Department of Natural Resources between 1992 and 2003 shows that pH values *upstream* of the quarry and two miles downstream of the quarry are similar and are too low to meet state standards. Three and a half miles below the quarry pH in McKenzie Creek is improved by the inflow of more alkaline buffered water.

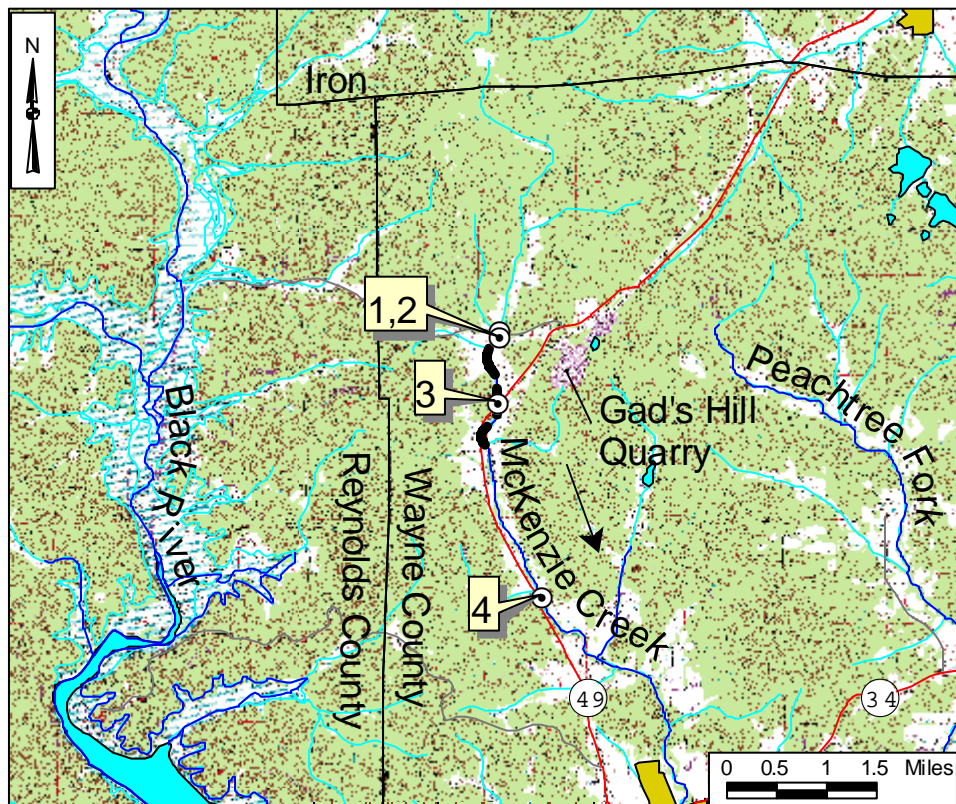
---

<sup>1</sup> Based on data from the National Atmospheric Deposition Program, National Trends Network for rain in southeastern Missouri.

The TMDL examines several possible sources of acidity and concludes that the principal source in McKenzie Creek is unbuffered acid rain. This rain is partially attributable to sulfur dioxide emissions from the Glover Smelter, which is 17 miles from the creek. Since this smelter closed December 2003, it is assumed that the precipitation will be less acidic. Future monitoring of the creek should determine whether this is true or not.

Since pH is not a concentration, a daily maximum load cannot be calculated. Therefore the endpoint for the TMDL is simply that there shall be no deviation from the pH standard of 6.5-9.0 SU. The U.S. Environmental Protection Agency approved the TMDL on November 15, 2004.

### McKenzie Creek in Wayne County, Missouri, with the Impaired Segment and Sampling Sites



--- Impaired Segment      → Direction of Flow

#### Site Index

- 1 – McKenzie Creek 0.1 mile above Quarry tributary
- 2 – Tributary from Gad's Hill Quarry near mouth
- 3 – McKenzie Creek 2 miles below Gad's Hill Quarry
- 4 – McKenzie Creek 3.5 miles below Gad's Hill Quarry

### pH in McKenzie Creek

Date	Site #			
	1	2	3	4
October 15, 1992			6.2	6.4
September 16, 1993	5.7	5.2	6.0	7.1
April 15, 1994		6.3		7.1
September, 1999			6.6	7.5
April 6, 2000	6.2		6.2	7.6
May 18, 2000			5.9	7.4
August 24, 2000			5.9	7.6
June 19, 2001			6.0	7.5
July 18, 2001			6.1	7.7
July 16, 2003	6.0		6.1	7.4

Source: Missouri Department of Natural Resources

**For more information call or write:**

Missouri Department of Natural Resources

Water Protection Program

P.O. Box 176, Jefferson City, MO 65102-0176

1-800-361-4827 or (573) 751-1300 office

(573) 522-9920 fax

Program Home Page: [www.dnr.mo.gov/env/wpp/index.html](http://www.dnr.mo.gov/env/wpp/index.html)